Island, in the Leyden Museum, obtained by Mr. Keulemans, according to Dr. Finsch (*in litt.*), agrees in nearly every respect with the male, except in the following points:—The feathers of the crest, which are as long, if not longer, than those in the male, are uniform brown, without the metallic lustre; the coloration of the back is a little darker, the upper wing-coverts shew less of the bronze lustre, and the feathers of the neck, sides of the head, and the lower part of the crest have lighter shafts; the dimensions also are somewhat smaller—wing 313 mm.; tail 110; tarsi 67. According to Keulemans, "the bill is brick-red; the iris brown; the feet reddish yellow; the naked skin of the head black."

It would appear from Cassin's statements that the "young bird has the under parts with oval spots of dull yellowish."

Mr. Keulemans gives a good account of the habits of this bird in Prince's Island, where it is known under the name of "Corvao."

In the preparation of this paper I have had to resort to Dr. Dubois, Dr. Finsch, and Mr. Ogilvie-Grant for information, which has been freely and kindly given, and to them I owe my best thanks.

XVII.—*On the Eggs of the Moa.* By Dr. A. B. Meyer.

When visiting the Museum of the Royal College of Surgeons of England in the autumn of 1901, I saw an egg of the Moa, and not having been previously aware of its existence I tried to hunt it up in the literature of the subject. On this occasion, as well as formerly, when studying the literature of the eggs of *Æpyornis* (see Abh. Ber. k. Zool. Mus. Dresden, vol. ix. no. 7, 1901), I collected certain facts concerning the known eggs of the Moa—reproduced here in an abbreviated form.

Moa's eggs are very much rarer than those of *Æpyornis*, thirty-six of the latter being known, whereas only three or four perfect Moa's eggs are as yet recorded, besides a dozen or

more imperfect or reconstructed specimens. In the published list of eggs of *Æpyornis* (*l. c.* p. 4) only thirty-three specimens were enumerated, but I have since heard of three more, which may be mentioned here incidentally:—

One in the Museum of the Royal College of Surgeons of England, where I saw it in the year 1901. 295 by 190 mm.

One in the Bristol Museum, formerly in Sir Greville Smith's collection (see 'Nature,' vol. lxv. p. 324, 1902).

One sold by auction at Stevens's Rooms, London, in June 1902, for £40—and brought by Mr. Edw. Gerrard of London. 314 by 216 mm., circumference 862 by 707 mm. (See also 'Nature,' lxvi. p. 160, 1902.)

I am indebted to Sir Walter Buller for several notes, of which use has been made in the following paragraphs; and I shall feel quite satisfied if my unpretentious communication rescues from oblivion some further specimens of Moa's eggs, if they by chance have escaped my notice.

1. George Dawson Rowley (Brighton) figured in the year 1878 the fine Moa's egg in his possession (Orn. Misc. iii. p. 244, pl. cxiv.). It is, according to the drawing, 252 by 178 mm., and has also been figured by Sir Richard Owen in his Memoirs on the Extinct Wingless Birds of New Zealand, 1879, pl. cxvii. p. 318. It is referred to *Dinornis ingens* Owen (*Dinornis novæ-zealandiæ* Owen) and was found in 1859 or previously in the South Island. Mr. Rowley about six years later paid £100 for it (not £200 as erroneously stated, Abh. Ber. Zool. Mus. Dresden, vol. ix. no. 7, 1901, p. 1, note 1). The egg is nearly perfect except for "a hole on the underside" (Rowley, *l. c.* p. 244). The present owner is, I am told, Mr. G. F. Rowley, St. Neots, Huntingdonshire. It has been mentioned by A. R. Thomson, 'The Story of New Zealand,' i. p. 33, 1859; compare also J. D. Enys, Tr. Pr. N.Z. Inst. iv. pp. 363 & 403, 1871.

2. The Otago Museum in Dunedin, New Zealand, received in July 1899 "a complete Moa's egg" (Tr. Pr. N.Z. Inst. xxxii.

p. 438, 1900), concerning which Sir Walter Buller has given me the following particulars :—

"About the year 1898 an almost perfect specimen was found by a gold-dredging party in one of the Otago rivers, the Clutha or Molyneux [in the south of the South Island]. It was brought up by the dredger and, being hollow, floated on the surface of the water. The Government claimed it, and threatened litigation for its recovery ; but, in the end, the miner was allowed to sell it for £50, for presentation to the Otago Museum." Subsequently Dr. W. B. Benham, Curator of this Museum, published similar items of information (Tr. Pr. N.Z. Inst. xxxiv. p. 149, July 1902 ; read before the Otago Institute, June 11th, 1901) with some description and a rather insufficient reduced illustration (*l. c.* pl. vii.). Size 195 by 135 mm., circumference 522 by 428 mm.; weight 286·5 gr. Dr. Benham (*l. c.* p. 150) refers the egg to *Euryapteryx ponderodus* [?] or [*Pachyornis*] *elephantopus* (Owen) *.

G. Krause (Illustrirte Zeitung, Leipzig, Nov. 21, 1901, pp. 780, 781) had some time before figured a cast of this egg of the natural size and given some details, furnished by Dr. Benham. The Dresden Museum possesses such a cast.

3. In July 1901 Mr. R. Barnekow, of Awahuri, North Island, New Zealand, informed me that "some hundred miles" from his place a Moa's egg had been recently found, and that it was in the possession of "The Dredging Co.," which demanded no less than £500 for it—a price, moreover, stated to be only a "reserve-price in the case of sale by auction." The owner described it as "in perfect condition save for an almost imperceptible crack of about two inches ; dimensions 9 by 5 inches" (229 by 127 mm.). I surmise that this is the egg which was on sale by auction at Stevens's Rooms, in June of this year, described as "rather weather-worn at one part and has been cracked and mended at the

* Owen (Mem. Extinct Wingless Birds N.Z. 1879, pl. xc. p. 318) reconstructed an egg of *Pachyornis elephantopus* (Owen) to 233 by 183 mm., but in our present (and still very imperfect) state of knowledge of Moas' eggs this is rather doubtful.

apex" (compare also 'Nature,' lxvi. p. 160, 1900). I heard that the reserve-price at this auction was £350 (according to 'Nature' £200), and that there was no bidder above £150, while the egg is reported to have gone back to New Zealand. My informant called the size "that of a medium Ostrich egg"; but this may have been an illusion, the more rounded eggs of the Ostrich looking larger than they really are, according to G. Krause (see above, sub No. 2), and measuring only about 150 by 120 mm. (Some years ago, 'Nature' reported (*l. c.*) that a Moa's egg had been sold by auction for £250. I have not been able to trace this egg, and do not know where it is now. Perhaps it refers to No. 4.) The egg of the London auction in 1902 appears to be the same of which Dr. Benham (Tr. Pr. N.Z. Inst. xxxiv. p. 150, 1902; read before the Otago Inst., June 11th, 1901) recently wrote:—"I had an opportunity of examining a second entire egg, which was obtained some months later by the same man [viz., 'a dredge-hand on the Earnscleugh gold-dredge, working on the River Molyneux, Otago,' see No. 2 and *l. c.* p. 149] about a hundred yards below the spot at which our specimen [see No. 2] was taken. The egg had been dipped in shellac (?), and was in a very dirty condition when it was brought to the Museum in order that the taxidermist might clean it before its transmission to London for sale. He refused, however, to undertake the responsibility . . . the two ends were similar, so that the egg was a perfect ovoid." Dr. Benham gives the following measurements: 201 by 138 mm., circumference 540 by 440 mm. These measurements, it is true, do not agree with those given to me by Mr. Barnekow (229 by 127 mm.); nevertheless I take it for granted that they refer to the same egg, my correspondent not having taken the measurements himself, and the owners probably not having been well versed in measuring birds' eggs.

4. Sir Walter Buller has furnished me with the following notes:—"About the year 1892 Sir George Grey (the former Governor) wrote informing me of the discovery of a 'nearly perfect egg' (supposed to be that of *D. robustus*) in

the South Island. It had been offered to him for £50, and he sent the letter on to me. I obtained further particulars from the owner and found that the egg was too much broken to be worth buying." I do not know the present owner of this specimen ; it may be that mentioned in 'Nature,' lxvi. p. 160, 1902 ; compare sub No. 3.

5. According to Tr. Pr. N.Z. Inst. xxxi. p. 738, 1899, "the greater part of the egg-shell of a Moa" was found in sandy soil near Clyde, Central Otago, South Island, and received by the Otago Museum in August 1898. "Another specimen was found with it, but was accidentally destroyed." To this fragment we may perhaps also refer Dr. Benham's (Tr. Pr. N.Z. Inst. xxxiv. p. 150, 1902) remark as to two or three more or less damaged specimens "that have been through his hands," viz., that they all belong to the genus *Euryapteryx*.

6. Sir Walter Buller knows of an imperfect specimen in the collection of Mr. Augustus Hamilton, Registrar of the Otago University in Dunedin.

7. The same authority informs me that Mr. Turton, of Dunedin, possesses a much broken egg, which was obtained, as he believes, in the Queenstown district, Otago.

8. There is one half of an egg in the Colonial Museum at Wellington. According to Sir James Hector (P. Z. S. 1867, p. 991), two were discovered in the alluvium of the Upper Clitha Plains, Otago, South Island, but only one nearly complete side could be put together, consisting of about twenty fragments; this egg measured 242 by 153 mm. One had contained "bones of an embryo chick" (comp. P. Z. S. 1867, p. 991 ; Tr. Pr. N.Z. Inst. iv. pp. 110 & 363, pl. vi. p. 187 ; and Owen, Extinct Birds N.Z. 1879, p. 319).

9. The egg in the Museum of the Royal College of Surgeons of England, mentioned in the beginning of my communication, was "cracked and pieced together," and measures "216 by 142 mm.," for which particulars I am indebted to Prof. C. Stewart. I could not inspect it closely, as the opening of the case was beset with some difficulties. Judging from outside, the egg did not give the

impression of having been mended. In shape it is a long oval, not pointed. It is not mentioned in the printed Catalogues of the College. This egg belongs to the so-called Mantell's "models" (see below), about which Sir Walter Buller says :—"Mantell's so-called 'models' were ingenious reconstructions from fragments of shell, sorted out and put together with infinite labour. The late Mr. Walter Mantell informed me that the best and most perfect of these—one of an ivory-white appearance—was given away by him, many years ago, to some friend in England, and in recent years he had been unable to trace it. There are several of these 'models' (all more or less imperfect) in the possession of Mr. Mantell's son in Wellington. Mr. Walter Mantell made large collections of Moa bones and fragments of egg-shells at Waingongoro in the North Island and at Waikouaiti in the South Island, between the years 1848 and 1856." This agrees well with W. B. D. Mantell's own description (Tr. Pr. N.Z. Inst. v. p. 96, 1872) :—"The fragments of egg-shells from these *umus* * varied in size from less than a quarter of an inch of greatest diameter to three or four inches. These, after careful washing, I had sorted, and having, with some patience, found the fragments which had been originally broken from each other and fitted together, I succeeded in restoring at least a dozen eggs to an extent sufficient to shew their size and outline. Six or seven of the best of these I gave to the British Museum † after their purchase of the collection; one is in the Museum of the College of Surgeons; the rest, including one very beautiful egg with a polished ivory-like surface, are still in my ownership somewhere in England. Some idea of the labour entailed by this attempt to rehabilitate eggs may be gathered from the fact that several of those restored consisted of

* "The bones and egg-shells of *Dinornis* and its kindred, mixed with remains of every available variety of bird, beast, and fish used as food by the aborigines, being all in and around the *umus* (or native ovens) in which they had been cooked."

† As we shall presently see, *sub* No. 10, the British Museum now contains only three.

between 200 and 300 fragments. I may add that in the markings, size, and so forth, of the eggs (making allowance for the alteration of the former toward the ends of the eggs) I made out about twenty-four varieties, of which I have specimens." In the Proc. Wellington Philos. Soc. (Tr. Pr. N.Z. Inst. iv. p. 364, 1872) occurs the following paragraph as to these "models":—"Mr. Mantell explained that he had restored, more or less perfectly, about twenty eggs, and that he had, as a rule, found them imperfect at one end, as if a hole had been artificially formed for the purpose of extracting the contents, and perhaps to allow of the shell being used as a water vessel . . ." From part of these fragments Owen restored the egg referred to *Emeus crassus* (Owen) from the South Island and figured by him, which is now in the British Museum (see *sub* No. 10).

10–12. There are three specimens restored in plaster in the British Museum and several fragments (see Oates, Cat. Eggs, i. p. 8, 1901); according to the Catalogue the fragments were collected by Mr. Mantell, the three restored eggs only doubtfully so. Owen had already figured one of these (not two as Mr. Oates says), supposed to be that of *Dinornis* [*Emeus*] *crassus* Owen: the other egg figured by Owen, and supposed to belong to *D. ingens* Owen, is not in the British Museum, but in the Rowley Collection, as mentioned above, *sub* No. 1. The last-named is the original of Owen's pl. cxvii. in 'Mem. Extinct Wingless Birds New Zealand,' p. 318 (1879), whereas the British-Museum egg is figured pl. cxv. (p. 317), as well as in Rowley's 'Orn. Misc.' iii. p. 244, pl. cxv. (1878). It is incomplete and put together from small pieces, measuring, according to the drawing, 190 by 151 mm., according to Oates (*l. c.* p. 7) 7·25 by 6 in. [184 by 152 mm.]. The other two restored specimens in the British Museum measure, according to Oates, 7·75 by 5·25 and 8·1 by 5·9 in. [197 by 133 and 206 by 150 mm.]. I do not understand why the Catalogue questions the fact that these were from the Mantellian Collection, Owen stating this, so far as I can see (*l. c.* p. 317), and Mr. Mantell himself saying so (see above under No. 9). I may mention

List of known Moa's Eggs or Fragments thereof.

No.	When found.	Condition.	Locality.	Species.	Size.	Owner.
					mm.	
1.	1859	Nearly perfect.	South Island.	*D. novæ-zealandiæ*, Owen.	252 by 178	Rowley Collection, St. Neots.
2.	1898	Perfect.	Molyneux River, S. I.	*Pachyornis elephantopus* (Owen)?	195 „ 135	Otago Museum, Dunedin, N.Z., S. I.
3.	1899	Perfect.	„	?	201 „ 138	Dredging Co., N.Z.?
4.	1892	Nearly perfect.	South Island.	*D. robustus* Owen.	?	?
5.	1898	Greater part.	Clyde, S. I.	*Euryapteryx* sp.	?	Otago Museum, Dunedin, N.Z., S. I.
6.	?	Imperfect.	?		?	A. Hamilton, Otago, N.Z., S. I.
7.	?	Much broken.	Queenstown district, Otago, S. I.	?	?	Mr. Turton, Dunedin, N.Z., S. I.
8.	?	Half.	Upper Clitha plains, Otago, S. I.	?	242 by 153	Colonial Museum, Wellington, N.Z., N. I.
9.	About 1850	"Model."	?	?	216 „ 142	R. College of Surgeons of England, London.
10.	„	„ incomplete.	South Island.	*Emeus crassus* (Owen).	184 „ 152	British Museum, London.
11.	„	„	?	?	197 „ 133	„
12.	„	„	?	?	206 „ 150	„
13.	„	"Models."	?	?	?	Mr. Mantell, jr., Wellington, N.Z., N. I.

here, incidentally, that Owen constructed the egg of *Dinornis maximus* to 412 by 326 mm., according to pl. cxix. p. 320 (*op. cit.*).

13. Several "models," according to Sir Walter Buller, in the possession of Mr. Mantell, jr., in Wellington (see No. 9).

Fragments of egg-shells are to be found in several Museums, as at Tring, Vienna, &c.

A very useful Bibliography, which we owe to Mr. A. Hamilton (Tr. Pr. N.Z. Inst. xxvi. pp. 229–257, 1893), entitled 'Materials for a Bibliography of the Dinornithidæ, the Great Extinct Birds of New Zealand, usually called Moas,' contains also a great deal about the eggs, and recently Dr. Benham has given us a small and rather incomplete bibliography (*l. c.* xxxiv. p. 151, 1902).

Royal Zoological Museum, Dresden,
December 4th, 1902.

XVIII.—*Bird-Notes from Morocco and the Great Atlas.*

By E. G. B. Meade-Waldo.

(Plate VI.)

During the summer of 1901 I took a journey through the Central Provinces of Morocco and part of the Great Atlas range. The chief object of my trip was to observe the birds, and to collect such as appeared to be worth collecting. I also, however, devoted a considerable portion of my time to entomology. M. Henri Vaucher, a Swiss gentleman and naturalist for many years resident in Tangier, accompanied me as taxidermist and interpreter, and I found his knowledge of the country and his tact in dealing with the by no means easily-managed inhabitants to be simply invaluable; so that I consider that to him such success as attended our expedition is largely due. We started with the usual caravan of horses and mules, ten animals in all, and with seven Moorish servants, the whole of whom behaved well during our long journey, which commenced on May 8th and did not finish until August 21st.